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ABSTRACT

The concern that minimum competency testing programs allow minimum performance levels to be accepted as the maximum was investigated, using reading and mathematics achievement test data in one state. State and local school district standards were defined as the number of students falling below each standard, thus needing remediation. Test results were, in most cases, taken from the Iowa Tests of Basic Skills, administered in grades four, seven, and ten. The districts sampled had applied for Title I funding, and were classified as low, middle, or high socioeconomic status (SES). Results indicated a high correlation between the number of students identified for remediation by state and by local standards. Correlations were highest in low SES districts. Reading test results based upon local standards exceeded the results based upon state standards by over 90%, most often in middle SES districts. As the discrepancy between state and local standards increased in size, the local standard tended to be the most stringent. It was also found that remediation needs increased with grade level. It was concluded that the setting of local standards was feasible; that higher standards appeared to be associated with wealthier districts; and that district standards tended to be higher than this state's standards. (GDC)

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LOCAL COMPETENCY STANDARDS vs. STATE STANDARDS AND THEIR RELATION TO DISTRICT SOCIOECONOMIC STATUS*

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INTRODUCTION

Context of the Problem

Much national speculation has occurred on the issue of local competency standards in basic skills. How would they be set? Who would set them? Would they be low or high? Would they relate to a district's wealth? What would be their effect? The issues have become even more complex now that so many states have begun setting statewide standards. As of one year ago, the number of states setting performance standards in basic skills was 31 (Pipho, 1978) and the number has grown since then. Many people were concerned that the process of statewide standard setting would cause the "minimum" to become a "maximum."

In essence, the question of standard setting is a question of whether its basis is rational or not and, if it is rational, on what is it based. Glass (1978) offers six classes of technique for determining such standards on an a priori basis. However, Scriven (1968) counters with the following remark:

> It is depressing that anyone in an applied science field like educational tests and measurement should talk as if R & D never existed, as if one doesn't automatically have to investigate the consequences of proposed standards in order to modify them for a second iteration, and so on. (p.274)

*Paper given at meeting of National Council for Measurement in Education, San Francisco, Calif., April, 1979.

The existing use of statewide tests and standards makes possible the study of their effects. In other words faced with the perplexing problem of how to determine what standard to choose, and having resolved it, in most cases, arbitrarily, it makes sense to study the subsequent impact of the standard and its relation to other variables.

Statement of the Problem

In place of judgment, attitude, or speculation, this study looked empirically at the results of the process of having both local districts and the state set minimum competency standards in a given year and the relationship between these standards and district wealth. The effect of each standard, as a reflection of its level, was defined as the number of students identified as needing remediation by the application of each.

Review of Literature

Much is written about the available methods for setting standards or cut-off scores on criterion-referenced tests, most of which is reviewed by Glass (1978). Hambleton (1978) identifies methods based on (1) item content, (2) educational consequences, (3) psychological and financial costs, (4) performance of others and (5) errors due to guessing and item sampling. He goes on to say that "...all of the methods are arbitrary (emphasis his) and this point has been made or implied by everyone whose work I (Hambleton) have had an opportunity to read." (p.281)

Since the minimum competency movement is a recent one, efforts have focused on test development and standard setting - those steps necessary to put programs in place. No work, to date, has been done on the impact or effect of these programs.

Why should we consider the results of competency testing with respect to the variable of school district wealth? Rohwer (1971) and Jantz (1974) have shown that sex, race, intelligence and socio-economic status are factors which affect student achievement. Averch & Kiesling (1974) found that school achievement, using the school as the unit of analysis, was significantly related to socio-economic indices. Guthrie et al. (1971), in a review of 17 studies dealing with the effect of school services on student achievement, reported that indices reflective of district wealth such as student/staff ratios, teacher salaries and per pupil expenditures were significantly related to student achievement. On this basis we might expect the effects of statewide testing and standard setting to be different for wealthier districts than for poorer ones.

Hypotheses

Four hypotheses were tested, as follows:

1. the number of students in a district identified as needing remediation will correlate for the two standards, state and local;

2. the degree of correspondence or correlation will be greater in poorer than in wealthier districts;

3. the local standard will be more likely to be more stringent than the state's standard in wealthier than in poorer districts and;

4. as the difference in results between local and state standards increases, the likelihood of the local standard being more stringent will also increase.

Rationale

The hypothesized relationship between the number of students identified as below the state standard and the number below the local standard (hypothesis one) is predicated on the expectations that 1) both are determined on the basis of basic skill attainment and 2) districts are rational in their setting of local standards, that is, districts with more students of high ability set higher standards than districts with fewer students of high ability. This hypothesis does not predict that the two standards will be the same; only that they will be parallel across districts in the state reflected by a sliding local district standard which accurately reflects the ability level of the students in the district.

Since it is unlikely that the correlation predicted in the first hypothesis will be perfect, it is possible to speculate on factors which affect the discrepancies between parallelism of the two kinds of standards. The second hypothesis predicts that greater divergence will occur in high SES districts than in low ones. Low SES districts are expected to have greater numbers of

low ability students and hence stay closer to a truly minimum competency requirement in order to keep remediation needs and public opinion within manageable constraints. Wealthier districts with a considerably lesser number of truly "incompetent" students will be freer to set more stringent standards. This should be reflected in the testing of hypothesis three.

Finally, on the assumption that the state standard is truly a minimum one, it is expected that where greatest variation exists, between state and local standards, it will occur because the local standard is higher (hypothesis four). The confirmation of this hypothesis will lend support to a conclusion that the minimum has not become a maximum.

METHOD

Sample

Of the 578 school districts in the State, 538 (or 93%) were included in the study. These were all the districts that had applied for Title I funds in 1976 (the yearly data base used in the study) and hence were required to set local standards in reading and mathematics and measure their attainment. The districts in the sample contained 97.8% of all State student enrollment. Although the sample came from a single state, virtually the entire state's data were included in the analyses.

Measurement of Standards

Since districts used different tests to measure the attainment of standards and these, in turn, were different from the Educational Assesment Program used by the State, it was impossible to use test scores as a basis for comparison. Therefore, the measure of the magnitude of standard was the number of students identified as falling below the standard, that is, the number identified as needing remediation. This approach made it possible to compare the results

in different districts with that of the State using number of students as the common unit of analysis.

Six sets of testing results were used representing two subject areas: reading and mathematics, and three grade levels: fourth, seventh and tenth. The State Department of Education provided access to all Title I applications in the State wherein were reported procedures used to assess student competency levels in reading and mathematics a minimum competency standard in each subject, and the number of students scoring below the standard. Most (but not all) districts reported using the Iowa Test of Basic Skills for this purpose.

State results were determined using a statewide testing program in reading and mathematics. A Statewide standard of 65% correct was adopted by the State as its cutoff score. Because Statewide testing was only done in grades 4, 7 and 10, this study was restricted to these three grade levels.

Measurement of District SES

The State had adopted an index called District Factor Grouping to describe the socio-economic status of each district in the State. The variables used in this classification and their weightings are as follows: adult education level (28%), occupational background (24%), per capita income (19%), percent poverty level (13%), unemployment rate (10%), population density (4%), degree of urbanization (1%) and population mobility (1%). Districts are assigned a letter for classification purposes with A representing the lowest (i.e., poorest district) and J the highest. The larger districts tend to fall into the lowest three categories. For purposes of this study districts in categories A, B and C were classified low SES, districts in categories, D, E, F and G middle SES and districts in categories H, I and J high SES.

Data Analyses

The relationship between local and state standards for both reading and mathematics at the fourth, seventh and tenth grade levels were analyzed in each hypothesis. For hypothesis one, Pearson product-moment correlations were computed between numbers of students identified as needing remediation by each standard across the sample districts. For hypothesis two, correlations were compared across low, middle and high SES districts using the Fisher Z transformation of the chi-square distribution.

For hypothesis three, districts were categorized as (1) having local standards 50% or more higher than the state standard (that is, using the local standard the number of students identified as needing remediation was 50% or more higher than the number of students identified as needing remediation based on the State standard), (2) having State standards 50% or more higher than the local standard or (3) local and State standard within 49% or one another. Distribution of districts across the three categories was then compared to the three SES categories using a chi-square test. This analysis was done only for reading.

For the last hypothesis, the lower of the two standards was divided by the higher to form a ratio. That is, the number of students identified as needing remediation by one standard was divided by the number identified as needing remediation by the other with the smaller number always serving as numerator. This provided an index of the absolute size of the discrepancy between the standards (without regard to direction). These were then divided into tertiles; i.e., largest third, middle third, lowest third. The distribution of districts into these magnitude-of-

discrepancy categories was then crossed with variable: state standard higher vs. local standard higher to see if increasingly large discrepancies were more often a function of locally higher standards or higher State standards. Again, the standard was measured as the number of students identified by it as needing remediation.

RESULTS

Hypothesis One

The first hypothesis predicted a high correlation between number of students identified as needing remediation by State and local standards. The mean number of students identified as needing remediation by each standard in reading and mathematics at each grade level as well as the correlation between these numbers on a district-by-district basis appears in Table 1. (The means are also shown graphically in Figure 1.) The six correlations were .97, .96, .95, .95, .93 and .90. These correlations indicate a predictability of from 80 to 94% of the result for one standard given the other. Hence, hypothesis one is strongly confirmed.

Hypothesis Two

The second hypothesis predicted a greater correlation between standards in poor than in wealthy districts. The mean number of students identified as needing remediation in low, middle and high SES districts by each standard in reading and mathematics at each grade level as well as the correlation between these numbers on a district-by-district basis appears in Table 2. (The means are also shown graphically in Figure 1.) For the low SES districts the correlations ranged from 0.94 to 0.98 or from 88 to 96% overlap. For the middle SES districts the correlations ranged from 0.52 to 0.83 or from 27 to 69% overlap. For the high SES districts the correlations ranged from 0.64 to 0.86 or from 41 to 74% overlap.

Table 1

Mean Numbers of Students Identified as Needing Remediation by Local and State Standards and their Correlations

	READING	MATHEMATICS
GRADE 4 (N)	502	497
Local mean #	65.3	58.2
State mean #	17.7	51.6
r	0.95**	0.97**
GRADE 7 (N)	449	443
Local mean #	85.4	80.5
State mean #	61.3	93.8
r	0.96**	0.95**
GRADE 10 (N)	257	254
Local mean #	131.8	128.3
State mean #	95.3	107.3
r	0.93**	0.90**

**$p < .01$

TABLE 2

Mean Numbers of Students Identified as Needing Remediation in High, Middle and Low SES Districts by Local and State Standards and Their Correlations

	READING			MATHEMATICS		
	Low SES	Mid SES	High SES	Low SES	Mid SES	High SES
Grade 4 (N)	140	167	129	139	165	127
local mean #	136.3	45.5	39.7	115.4	44.3	36.6
State mean #	48.7	7.9	6.0	116.8	34.7	28.2
r	0.96**	0.71**	0.72**	0.98**	0.80**	0.82**
Grade 7 (N)	127	153	123	126	151	121
local mean #	155.6	69.1	56.9	145.4	62.2	57.8
State mean #	128.6	46.0	31.1	176.1	77.9	58.0
r	0.97**	0.75**	0.86**	0.96**	0.83**	0.74**
Grade 10 (N)	73	97	77	73	96	74
local mean #	224.0	104.5	76.2	212.9	102.3	78.1
State mean #	177.9	69.8	43.6	185.1	84.7	56.7
r	0.97**	0.63**	0.64**	0.94**	0.52**	0.73**

** $p < .01$

Comparisons between correlations by district SES category were made using a procedure based on the Fisher Z transformation of the chi-square distribution (Marascuilo, 1971). In all six cases (two subject areas by three grade levels) significant differences in correlations by district SES category were found. Post hoc comparisons revealed that in each instance the low SES district correlations were significantly higher than the other two while the middle and high SES districts' correlations were not significantly different from one another. Hence, hypothesis two is confirmed.

Hypothesis Three

Hypothesis three predicted more stringent standards in wealthy than in poor districts. That is, the number of students identified as needing remediation by local standards was expected to exceed the number identified by the State standard to a greater degree in wealthy than in poor districts. This hypothesis was tested only for reading. Using the criterion of a discrepancy of 50% or more between the numbers of students identified by local and State standards, a significant chi-square value was found for district SES level at the fourth grade only. When the discrepancy value was increased to 65%, significant chi-square values were found for both fourth and seventh grade. When the discrepancy value was increased to 90%, significant chi-squares between district SES categories were found at all three grade levels. These results, shown in Table 3, reveal that as hypothesized, it is the more affluent districts that are more likely to set the higher standards. However, this outcome can only be detected at very high levels of discrepancy. That is, it is only among the "outlyers" (i.e., those districts with local results

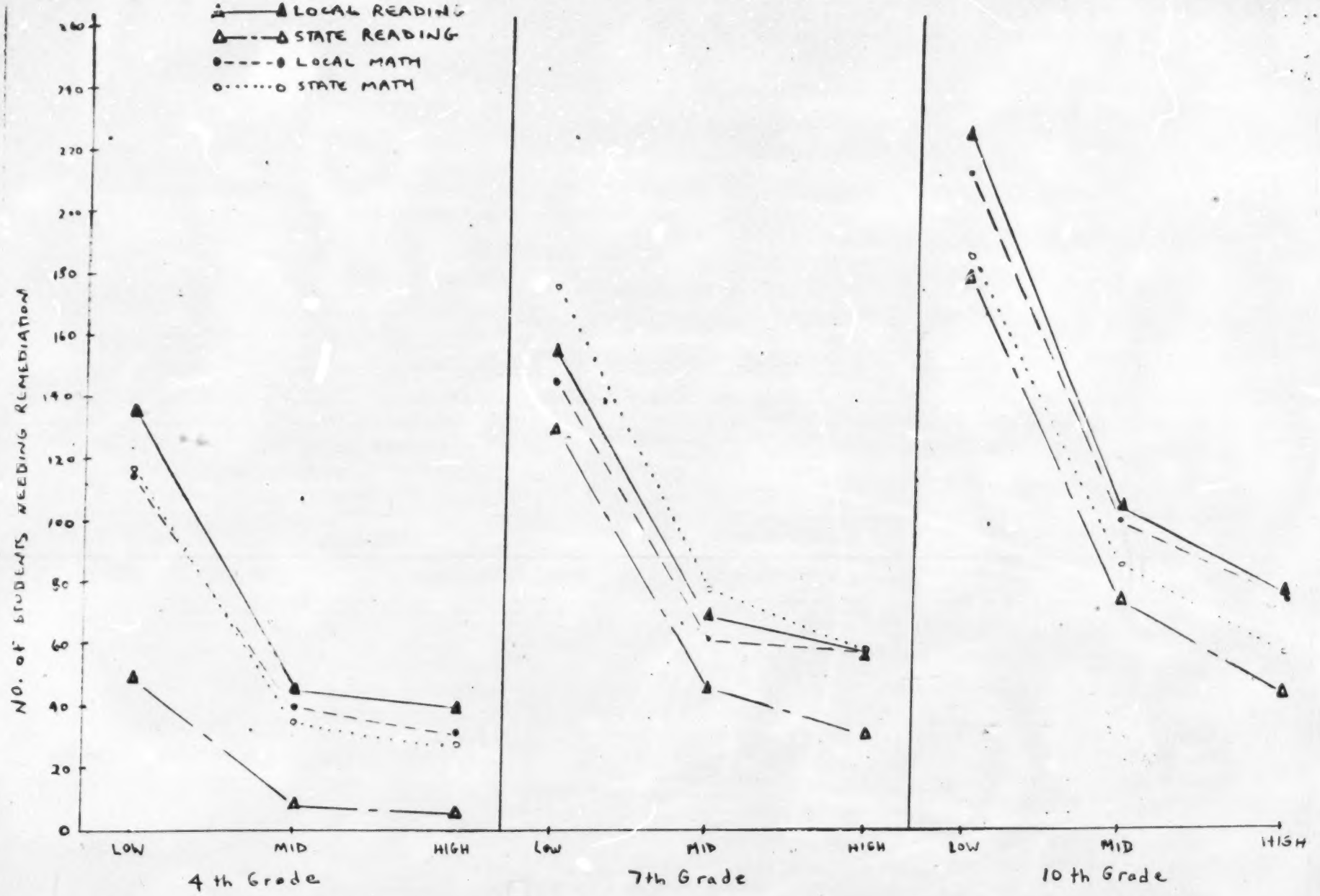

FIG. 1 NUMBERS OF STUDENTS DIAGNOSED AS NEEDING REMEDIATION IN READING AND MATH BY LOCAL AND STATE STANDARDS IN 4th, 7th AND 10th GRADE BY DISTRICT SES LEVEL

TABLE 3

Proportion of Districts where Results from Local Standards Exceeded Results From the State Standard by 90% or more as a Function of District SES Level

	GRADE 4		GRADE 7		GRADE 10	
	N	%	N	%	N	%
HIGH SES	100	32	34	24	12	16
MID SES	124	39	61	43	34	47
LOW SES	90	29	47	33	27	37

highly different from State results) where the relation to district wealth appears. Moreover, the results show that the number of discrepant districts is most pronounced in the middle SES range rather than among the highs.

Hypothesis Four

The last hypothesis predicted that as the difference in results between local and State standards increased, the local standard would tend to identify more students as needing remediation than the State standard. That is, the minimum (the State standard) was not expected to have become the maximum (the local standard). Coefficients were established by dividing the lower result by the higher and then assigning the result to one of the following three predetermined categories: 0.0 - .133 (reflecting the largest discrepancy between standards), .134 - .298 and .299 - 1.0 (reflecting the smallest discrepancy between standards). These categories were chosen because they resulted in all the districts in the sample being distributed approximately equally.

The results of these comparisons are shown in Table 4. In all but one of the six analyses (10th grade math being the exception), the largest discrepancies (i.e., smallest ratios of smaller over larger) were significantly associated with the local standard being higher than the State standard. Clearly at fourth and seventh grade levels, the minimum has not become the maximum. However, at the tenth grade level, where the number of deficient students is the greatest, the minimum and maximum show a tendency to converge.

Ancillary Findings

From Figure 1 it can be seen (as was mentioned above) that the number of students needing remediation at the seventh grade

TABLE 4

Distribution of Differences by Size Between Local and State Standards with Respect to Which of the Standards is Higher

	Smaller result÷ larger result	0.0 - .133		.134 - .298		.299 - 1.0		
		N	%	N	%	N	%	X^2
READING	GRADE 4							
	Local Higher	131	34[a]	128	34	122	32	17.3**
	State Higher	2	10	3	14	16	76	
	GRADE 7							
	Local Higher	117	37	105	33	93	30	14.2**
	State Higher	25	21	37	32	55	47	
	GRADE 10							
	Local Higher	59	33	67	37	55	30	6.1*
	State Higher	24	35	15	22	30	43	
MATHEMATICS	GRADE 4							
	Local Higher	90	33	103	37	81	30	7.6*
	State Higher	64	31	58	28	86	41	
	GRADE 7							
	Local Higher	107	42	78	30	71	28	26.2**
	State Higher	33	19	62	36	78	45	
	GRADE 10							
	Local Higher	47	34	48	34	45	32	0.8
	State Higher	33	32	32	31	39	37	

[a]Percentages are calculated across discrepancy categories to reflect the distribution of districts by percent across the three ranges of differences.

* $p < .05$ **$p < .01$

($\bar{x}$=80) exceeds that of the fourth grade ($\bar{x}$=48) and the number at the tenth grade ($\bar{x}$=116) exceeds that of the seventh grade. Hence, either the problem of student deficiency is becoming more severe or the standard is becoming more stringent. It is probably the former.

In addition, reading shows a relatively greater worsening over the grades. In the fourth grade the ratio of reading deficiency to math deficiency is 76%. By seventh grade this ratio has grown to 84% and by tenth grade to 96%. In other words, while there are almost 25% fewer fourth grade students needing reading remediation, the number of students needing remediation in each subject in the tenth grade is almost equal. These figures, however, are based on an averging of State and local figures. When one looks at the local figures alone, the numbers are much more equal for reading and math at all three grade levels. This suggests that the combined result is an artifact of the State test in reading getting harder, the math test getting easier or both.

DISCUSSION

Summary of Findings.

1. The number of students identified as needing remediation by local and by State standards were highly correlated (0.90-0.97).

2. Correlations between the results based on local and on State standards were significantly higher in low SES districts than in middle or high SES districts.

3. Results based on local standards exceeded results based on State standards (in reading) by 90% or more significantly more often in middle SES districts than in either low or high SES districts.

4. As the size of the discrepancy between the results based on local standards and the results based on State standards increased, the tendency for the local standard to be the higher of the two (i.e., to yield the greater number of students needing remediation) increased significantly as well.

All four hypotheses were confirmed. In addition it was found that:

5. The need for remediation increased with grade level.

Conclusions

1. Standard setting by local districts is consistent with State standard setting. This indicates that local districts are able to set realistic standards for themselves. However, this does not suggest that the State abandon its role since State standards may serve as the impetus for the local process of realistic standard setting to occur. It does seem fair to conclude, based on the correspondence of local and State results, that local standard setting can be done on a rational basis. (The determination of how this is done was beyond the scope of this study.)

2. The State standards correspond most closely to those established by the poorer districts suggesting that the State standard does, in fact, represent a minimum. However, it must be emphasized that the correspondence between State and local results across all districts is far more dramatic than any noncorrespondence. Any fear that realistic standard setting would be for poor districts only seems unwarranted.

3. The most stringent standards, relatively speaking, are set by districts of intermediate or moderate wealth. Perhaps this reflects middle class strivings for achievement or upward mobility. Clearly, these districts of moderate means did not seem limited by State

results in the determination of their own needs.

4. The minimum has not become the maximum. Districts tend significantly more often to set higher as opposed to lower standards than the State particularly as the magnitude of the discrepancy increases. However, we cannot be overconfident that this tendency will continue particularly if the resources for providing remediation are not made available to local districts. While districts clearly have the capability to set realistic standards for themselves, their motivation to continue to do so may be function of their potential to deal with the need for remediation which this process identifies.

5. The remediation problem grows as students progress through school. As has been amply demonstrated in the past, the educational gap between high and low achievers widens rather than narrows as students move up the grades. Perhaps we have been too lax in our policy of social promotion. At any rate, as standard setting and competency testing give us greater and more accurate information about student deficiency, our responsibility grows concomitantly to do something about it.

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ABSTRACT

As statewide competency testing and standards proliferate, the worry becomes that for local districts the minimum will become the maximum. In this empirical study, the results of state and local standards were measured in terms of the numbers of students being diagnosed to be in need of remediation as determined by each. Resulting correlations over three grade levels and two skill areas (reading and math), ranged from 0.90 to 0.97 with a significant tendency to be higher in lower SES districts than in higher ones. While state and local results were found to be highly related, the local standards generated considerable higher numbers than the state standards in reading.